Message

From: Citta Jr., Joseph L. [/O=NPPD/OU=CGO/CN=RECIPIENTS/CN=JLCITTA]
Sent: 1/22/2014 6:02:15 PM
To: Vanek, Jason A. [javanek@nppd.com]
Subject: FW: GGS Regional Haze air emissions costs/operating impacts
Attachments: WFGD Pro Forma Results.pdf; Evaluation of Capital SCR Multiple Contract at 10%.pdf

Importance: High

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NPPD Corporate Environmental Manager
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Please consider the environment before printing this email.

From: Spencer, Michael J. [Mick]
Sent: Wednesday, January 22, 2014 11:01 AM
To: Citta Jr., Joseph L.; Fehr, James R.
Subject: RE: GGS Regional Haze air emissions costs/operating impacts
Importance: High

Joe and Jim,

Please look at the draft response to Tom. I've attached the sources for the O&M cost numbers (**note that I will not send these attachments to Tom**) so that we can replicate them in the future if necessary. The scrubber costs come from the first attachment, pages 10 and 11; this is for 0.28% sulfur coal similar to what we burn today. I included incremental labor, limestone, water, and gypsum disposal. The SCR costs come from the second attachment, pages 2 and 3. I included incremental labor, urea, and catalyst. I rounded the total costs to nearest million in each case. These were developed by S&L in 2009; and, to the best of my knowledge, have not been updated since.

I could not find any information on heat rate impact in the S&L info. Since this is back-end equipment, there may not be any impact to cycle efficiency. If either of you have something on heat rate, I'd appreciate it.

Tom said he needed the information by Monday; so, I'd like to get the response to him by close of business on Friday in case he has any follow-up questions.

Thanks!

Mick

Tom,

Before I answer the specific questions, I want to provide some context and background. The Regional Haze Rule requires best available retrofit technology (BART). The State of Nebraska in their State Implementation Plan (SIP) for Regional

Haze concluded that BART for GGS was low NOx burners on both units for NOx control, and no control for SO2 based upon the evaluation factors provided in the Rule. Note that both GGS units now have low NOx burners, and are in compliance with the requirement as it exists today. EPA took issue with Nebraska's SIP on several points; and indicated that it would impose a Federal Implementation Plan (FIP). However, it concluded that the Cross State Air Pollution Rule (CSAPR) was better than BART such that compliance with CSAPR would also satisfy compliance with Regional Haze. In the meantime, CSAPR was vacated by the Court. The Rule is currently awaiting hearing by the Supreme Court. As you may recall, we did not plan to make any significant changes at GGS other than low NOx burners on Unit 2 for compliance with CSAPR. So, although scrubbers for SO2 and/or selective catalytic reduction (SCR) for NOx may be required at some point in the future, there is no requirement for the pollution control equipment today.

1. SO2 scrubber installations are the highest cost option
   If we were to be required to install scrubbers for SO2 control, our analysis determined that wet scrubbers would be the best option; wet scrubbers will also meet best available control technology (BACT). SCRs are BACT for NOx control.
2. Systems would need to be operational on both units by 2019
   There is no current requirement. If scrubbers were ultimately mandated for Regional Haze this year, we believe the earliest compliance date would be sometime in 2019.
3. $1.046 billion total direct capital cost
   This is a reasonable budgetary estimate for wet scrubbers. SCRs would be an additional roughly $500 million.
4. Expenditures would occur in years 2017 and 2019
   For a 2019 compliance date, some level of expenditure would start in 2014/2015 to get major components on order. Tie-in dates would likely be 2018 and 2019; the major portion of installation costs would occur in those years.
5. annual operating costs: ?
   Note – the following costs are in 2019 dollars; these should be considered to be rough estimates.
   Scrubbers $13M/year (assuming coal sulfur content similar to today's value); SCR $9M/year
6. Estimated unit heat rate impact: ?
   ?????? Btu/KWh
7. Estimated unit net capacity impact: ?
   Scrubbers – 36MW, SCR – 10MW (total 46MW)

Let me know if you have questions.

Mick

From: Tom Davlin
Sent: Monday, January 20, 2014 2:43 PM
To: Wickizer, Cynthia J.
Cc: Spencer, Michael J. [Mick]
Subject: GGS Regional Haze air emissions costs/operating impacts

Cynthia, Mick,
LES is preparing sensitivity case for the annual rating agency report and we need to confirm/request information on the worst case situation for GGS NOx air emissions control. Can you confirm or supply the following information?

1. SO2 scrubber installations are the highest cost option
2. Systems would need to be operational on both units by 2019
3. $1.046 billion total direct capital cost
4. Expenditures would occur in years 2017 and 2019
5. annual operating costs: ?
6. Estimated unit heat rate impact: ?

7. Estimated unit net capacity impact: ?

Thanks

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